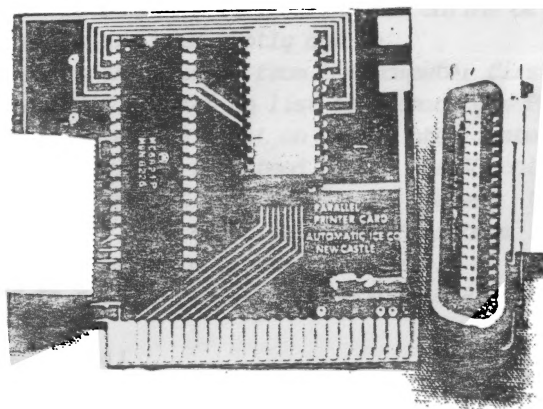


# automatic ice parallel printer card

for the Apple II & IIe





## INSTANT INTRODUCTION

The Automatic Ice Universal Parallel Printer Card is a peripheral card for the Apple II, IIe and III which drives most parallel connected dot matrix and daisywheel printers. It also contains graphics dumps (on the II and IIe) for most popular dot matrix printers.

### INTRODUCTION

- 1) Turn off the Apple.
- 2) Remove the lid.
- 3) Insert the printer card in Slot 1. Any slot except 0 will do, but 1 is normal. Graphics can only be dumped from Slot 1.
- 4) Pass the cable out the back of the Apple and close the lid. In the case of the IIe the cable and plug can be passed through the hole above the power supply.
- 5) Connect the Centronics connector to the printer. If the connector does not fit, e.g. Prism, Bytewriter then see your dealer. Other connectors are available from Automatic Ice.
- 6) Turn on the printer, load it with paper and ensure it is online to the computer by pressing the online or select switch. Some printers are permanently online.
- 7) To access the printer from the computer first load something such as a BASIC program to list out, then type PR#1 and then type LIST. The program will list on the printer instead of the screen. To allow the printer to extend beyond the 40 column screen size you need to type CTRL I 80 N (with no spaces) then RETURN. This initialises the printer to print 80 characters then a carriage return. To access the printer from within an Applesoft program you need to precede the PR#1 command with a CTRL D or CHR\$(4).

### EXAMPLE:

```
10 D$=CHR$(4)
20PRINT D$;"PR#1"
30PRINT "THIS IS HOW THE PRINTER WORKS"
40PRINT D$;"PR#0":REM TURNS THE PRINTER OFF
50 END
```

- 8) If the word PRINTER appears at the top right hand corner of the screen, the printer is either out of paper, not switched on or not online. You can continue printing by fixing the problem and pressing RETURN.
- 9) That's all you need to start using your printer. More detailed instructions follow.

## IN DEPTH

The Automatic Ice Co Universal Parallel Printer Card is a general purpose parallel output printer card suitable for connecting Apple II, IIe and III computers to most printers with a seven or eight bit parallel input. It outputs +ve true eight bit strobe with -ve strobe and expects a -ve acknowledge from the printer. This is the format expected by most printers but special EPROMs are available to support other modes.

It has onboard software to disassemble and output from the II and IIe high resolution graphics on page 1 and 2 to the printer. The one EPROM covers the following printers:

- 1) Apple D.M.P.
- 2) EPSON TYPE II and III
- 3) AMUST DT80
- 4) CASE
- 5) GRAPHICS STAR
- 6) MICROLINE 92 and 93
- 7) PRISM & PAPER TIGER
- 8) C. ITOH 8510 and 1550
- 9) SEIKOSHA
- 10) NEC FONTWRITER

Other printers not listed above may have the same graphics format, and trying them will not do any damage.

## TECHNICAL DETAILS

The card conforms to the recently published Apple Firmware standard and consequently may be incompatible with software which is outside of this standard. Such software includes Pascal 1.0 and CP/M 2.2. Later versions of Pascal and CP/M run with the card, but if you intend to run older versions of such popular programs as WordStar or PFS you will probably find they don't print properly. The card is assured, however, of being compatible with all future Apple correct software.

The card will output text in any slot except 0 but it must be in Slot 1 to output graphics. Pascal and CP/M always expect Slot 1.

The graphics dump routines use locations 2EF - 2FF at the top end of the keyboard buffer as scratchpad and any other program that uses these locations will overwrite graphics. There is also a monitor routine at \$F411 which must not be switched off by the memory card.

The Apple outputs a seven bit code with the eighth bit set high. The card strips the eighth bit and sends the seven bit code most printers expect. The eighth bit is ignored by most printers in the text mode but some printers output a different character set when the eighth bit is high (e.g. block graphics). There is a card command CTRL I H to set the

eighth bit high, and CTRL I X to reset it, but since the Apple only outputs seven bit code care must be taken with the interpretation of the character #\$8D when the high bit is set. The printer card interprets it as a carriage return and if it is set as a block graphics character a carriage return will occur.

Most printers use escape codes to change format, character sets etc. The Apple traps the escape character for cursor movement and it cannot be directly output to the printer. The solution is to print CHR\$(27) instead of the ESC character.

e.g. 10 PRINT CHR\$(27); "Q"

sets the Apple DMP printer to compressed print mode.

Most printers have a switch selectable function which outputs a linefeed or not after a carriage return. The printer card defaults to the condition of supplying its own linefeed after a carriage return in Applesoft, but not in PASCAL or CP/M. This means that the printer should be set not to generate a linefeed after carriage return (The normal factory setting), however the printer card operation can be software selected (Refer command table)

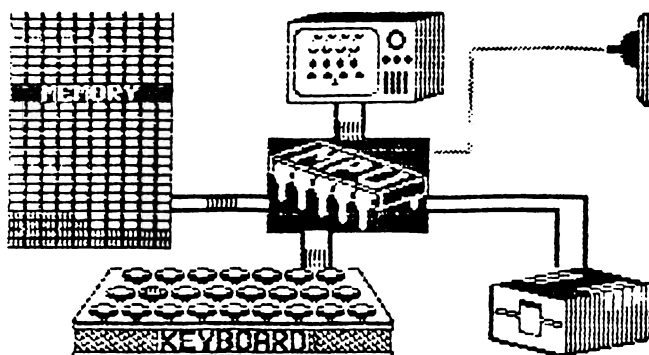
Using our EPROM programmer it is possible to modify the EPROM to support single keystroke custom letterheads (CTRL L) and print UPC barcode labels directly from the keyboard. Refer to Automatic Ice for details.

#### CABLE CONNECTIONS

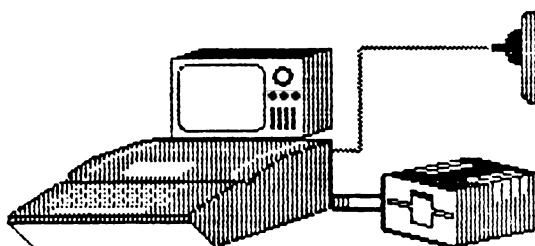
The 26 way ribbon is connected to a standard Centronics edge connector (Other connectors available on request). The following is a pinout description for connection to other plugs:

WIRE	FUNCTION	
1	STROBE	NEGATIVE/ACTIVE
3	DATA 0	+VE TRUE
5	DATA 1	" "
7	DATA 2	" "
9	DATA 3	" "
11	DATA 4	" "
13	DATA 5	" "
15	DATA 6	" "
17	DATA 7	" "
19	ACKNOWLEDGE	NEGATIVE ACTIVE
26	SELECT	POSITIVE ACTIVE

Wires 2,4,6,8,10,12,14,16,18,20,22,24 are ground and should be connected together to avoid crosstalk. Numbers on the wires begin with the blue outer wire as wire 1.



ALL WE NEED DO IS CONNECT A VIDEO SCREEN  
IN ORDER TO SEE THE RESULTS OF OUR WORK.



THE 'APPLE' MICROCOMPUTER.

## SOFTWARE COMPATABILITY

The card programming conforms rigidly to the latest published Apple Firmware standard and as such should run all recent and future Apple correct software. If your program hangs the best solution is to update the software as this will eventually be necessary anyway. If the setup software asks for a specification, enter "FIRMWARE".

## PRINTER CARD CONTROL CODES

The printer card is turned on by PR#1 and turned off by PR#0. From monitor the command is 1 control P and 0 control P.

The following printer card commands are all preceded by CONTROL I:

CTRL I I puts output to both printer and screen at 40 column width.

CTRL I n N returns output to the printer only and prints n characters per line where  $40(n/255)$ . When initialised the card outputs to the printer only.

CTRL I K turns off the linefeed provided by the card after every carriage return. When initialised the card defaults to a linefeed after carriage return in Apple soft but not PASCAL or CP/M.

CTRL I CTRL A exchanges the printer card escape character from CTRL I to CTRL A. This is sometimes necessary when listing a program to ensure that the printer doesn't perform sequences described in the program. Other characters than CTRL A can be used provided they don't conflict with other card commands. To return to CTRL I as the escape character the card must be turned off and then on again, or the sequence CTRL I CTRL A must be sent to the card/

CTRL I H sets the eighth bit high.

CTRL I X resets the eighth bit.

## HIRES GRAPHICS COMMANDS

The card has onboard software to support Apple hi-res graphics dumps to most dot matrix printers. All graphics commands are preceded by CTRL I G and then the letter associated with the particular printer. This may be followed by additional characters to specify other graphics features:

1 prints hires page 1

2 prints hires page 2

I inverse (white on black)

D double size pictures

E available only on EPSON, AMUST STAR, CASE and similar type printers. Causes picture to be printed double density.

J causes page 1 and page 2 to be printed side by side, and if the 2 pictures match up a horizontal resolution of 560 dots can be attained.

Additional pictures can be loaded in from disk allowing the printing of hires pictures of indefinite klength and 560 dots wide. With accurate software this can be used as a plotter to lay out such items as printed circuits, including double sided printouts.

W causes the C.I.TOH type printers to accept the character pitch set on the printer before the graphics mode is entered. On the AMUST, EPSON, STAR, CASE and SEIKOSHA printers W is used to start printing in from the left margin. The card expects the value of the indent from the left margin to be found in location \$2EF or 751 decimal. For the SEIKOSHA the value is the number of dot positions(480 for full line less 280 for picture)while for the others it is the number of characters in from the margin. e.g.from Applesoft

Poke 751,10

and from monitor

\$2EF:0A

start the SEIKOSHA picture 10 dots from the left edge.

In general picture printing starts at the left margin. Most other printers have a code to set the left margin.

A prints the top half of the picture.

B prints the top quarter.

#### SPECIFYING PRINTERS

All printers are the same regarding text but they have different ways of printing graphics and the printer must be identified when dumping graphics to it. Printer identification codes are as follows:

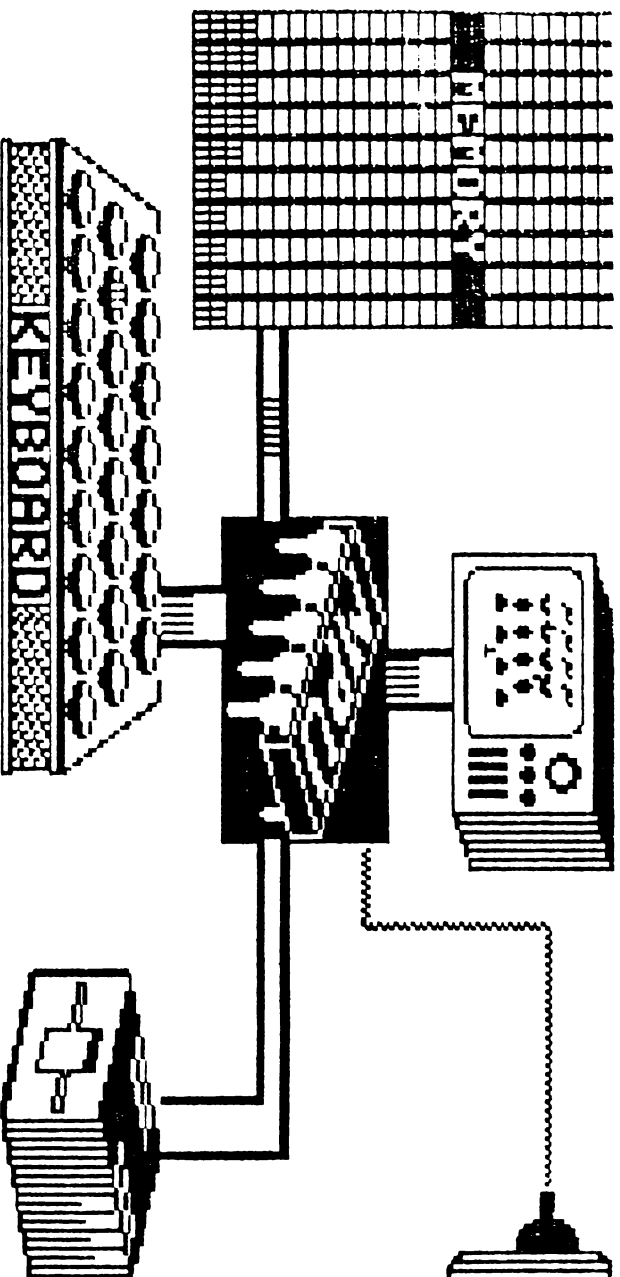
APPLE DMP	CTRL I G F
C.I.TOH	CTRL I G F
NEC	CTRL I G
AMUST, STAR, CASE	CTRL I G Q
MICROLINE 92 & 93	CTRL I G U
PRISM.	CTRL I G P
EPSON	CTRL I G M
SEIKOSHA	CTRL I G S

The SEIKOSHA can only print 480 dots/line and cannot do double or side by side. The EPSON has only 480 horizontal dots in normal mode causing the double size pictures to run off the page, but the addition of E to the string generates a normal picture in which each of the 280 horizontal dots is struck 3 times.

All appropriate graphics commands can be strung together but double size and side by side are not allowed together.



THIS IS DOUBLE SIZE PAGE



ALL WE NEED DO IS CONNECT A VIDEO SCREEN  
IN ORDER TO SEE THE RESULTS OF OUR WORK.

*EXAMPLES: To print page 2 on an EPSON in double size first get the picture on the screen. Then reset. This causes the picture to disappear but it is still in memory. Next initialise the printer with a PR#1. Then type CTRL I G 2 M D with no spaces between characters. i.e. hold the control key down, Press I, Release control and I then press g and release, then 2 and release, then M and release, then D and release and finally RETURN. The EPSON will now dump whatever is in Page 2 memory. If it dumps garbage it is likely the picture was in Page 1, so try again this time leaving out the 2.*

*To dump an inverse picture on Page 1 onto a C.ITOH type CTRL I G I. To dump half a picture on an APPLE printer type CTRL I G F A etc.*

*You can't do any damage experimenting with graphics dumps.*

#### ADDITIONAL FEATURES

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CONTROL I S SCREEN DUMP OF TEXT

CONRTOL I B TOGGLE SPOOLING

(APPLESOFT ONLY)

NOTE GRAPHIC COMMAND FOR DMP IS

CONTROL IG & CONTROL IGF FOR ITOH

& KEL PRINTERS. SET SW2-8 'on' FOR KEL.



